

# Service Manual

## Portable Cassette Recorder RQ-312S-E

Portable Cassette Recorder with Built-in Microphone  
and CrO<sub>2</sub> Tape Selector



### RQ-309S MECHANISM SERIES

#### Specifications (Catalog specifications for sales)

Power requirement:	AC; 90~109, 110~125, 200~219, 220~250V, 50/60Hz	Program time:	1 hour with C-60 cassette tape
Power consumption:	5W	Fast forward and	
Battery:	6V, (four UM-2, R-14 size dry batteries)	rewind time:	Approx. 90 seconds with C-60 cassette tape
Car/boat battery:	with optional car/boat adaptor RP-914-E in Europe	Track system:	2-track monaural recording and playback
Motor:	DC mechanical motor	Input:	MIC; sensitivity 0.25mV/applicable microphone impedance 200~600Ω (recommended microphone WM-2213N)
Frequency response:	50~11,000Hz (with CrO <sub>2</sub> tape) 50~10,000Hz (with normal tape)	Output:	MONITOR; 8Ω REMOTE; for start and stop at hand
Recording system:	AC bias	REC/PB connection:	5P DIN type
Operation:	Pushbutton operation with Auto-Stop mechanism	Speaker:	9cm, PM dynamic speaker
Tape speed:	4.8cm/s	Dimensions:	17.2cm(W)×7.5cm(H)×26.4cm(D)
		Weight:	2kg

Specifications are subject to change without notice for further improvement.

 **National Panasonic**

**Matsushita Electric Trading Co., Ltd.**  
P.O. Box 288, Central Osaka Japan

# LOCATION OF PARTS

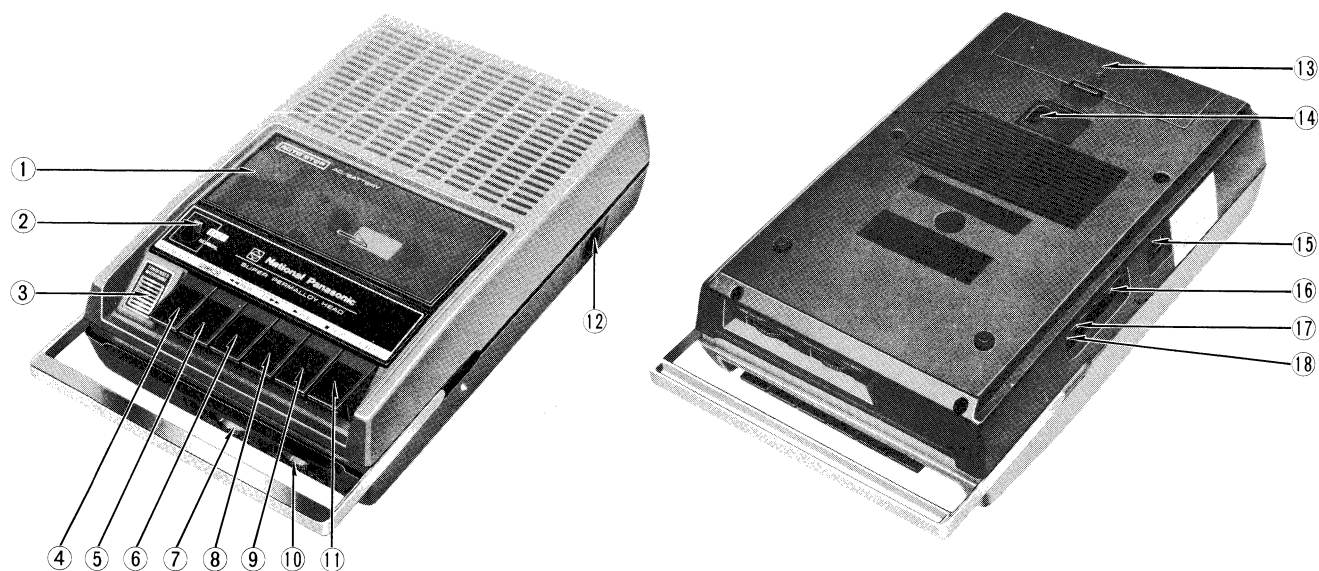


Fig. 1

- ①

Cassette compartment cover
- ②

Tape selector
- ③

Built-in microphone
- ④

Record button
- ⑤

Rewind button
- ⑥

Fast forward button
- ⑦

Tone control
- ⑧

Playback button
- ⑨

Stop button
- ⑩

Volume control
- ⑪

Cassette ejection button
- ⑫

DIN jack
- ⑬

Battery compartment
- ⑭

Voltage selector
- ⑮

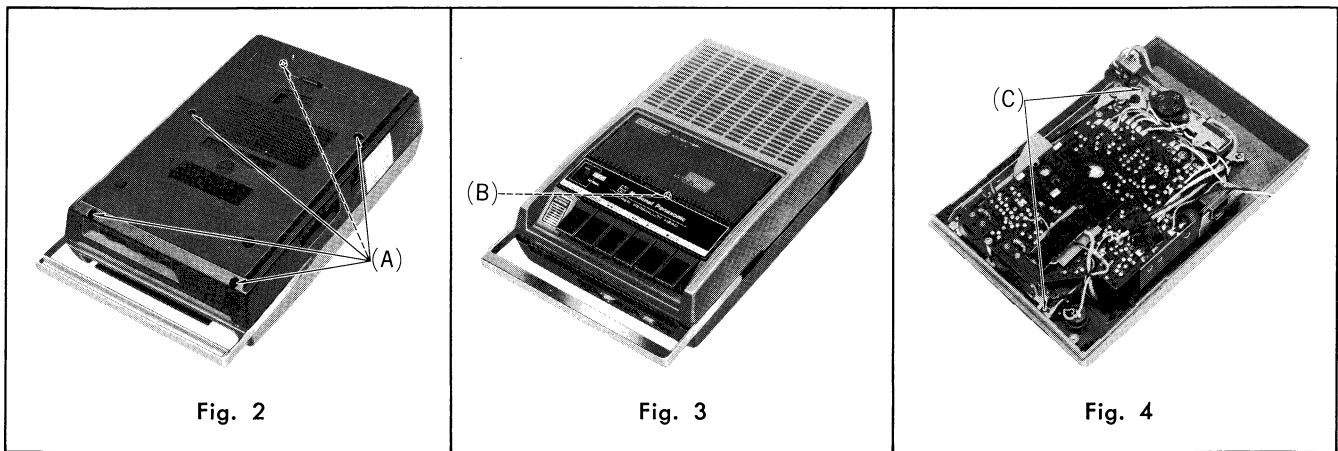
AC socket
- ⑯

Monitor jack
- ⑰

Remote control jack
- ⑱

External microphone

# DISASSEMBLY INSTRUCTIONS



Procedure	To remove —	Remove —	Pcs.	Shown in fig. —
1	Bottom case	(A)	(5)	2
2	Chassis	(B), (C)	(1), (2)	3, 4

# Service Manual

Portable Cassette Recorder

## RQ-312SD

**Supplementary**

Portable Cassette Recorder with Built-in Microphone  
and CrO<sub>2</sub> Tape Selector



**RQ-309S MECHANISM SERIES**

### Specifications (Catalog specifications for sales)

Power requirement:	AC; 240V, 50Hz Power consumption; 5W Battery 6V, (four UM-2, R-14 size dry batteries)	Fast forward and rewind time: Approx. 90 seconds with C-60 cassette tape
Motor:	DC mechanical motor	Track system: 2-track monaural recording and playback
Frequency response:	50~11,000 Hz (with CrO <sub>2</sub> tape) 50~10,000 Hz (with normal tape)	Input: MIC; sensitivity 0.25 mV/applicable microphone impedance 200~ 600Ω (recommended microphone WM-2213N)
Recording system:	AC bias	Output: MONITOR; 8Ω REMOTE; for start and stop at hand
Operation:	Pushbutton operation with Auto-Stop mechanism	REC/PB connection: 5P DIN type
Tape speed:	4.8 cm/s	Speaker: 9 cm, PM dynamic speaker
Program time:	1 hour with C-60 cassette tape	Dimensions: 17.2 cm(W) × 7.5 cm(H) × 26.4 cm(D)
		Weight: 2 kg

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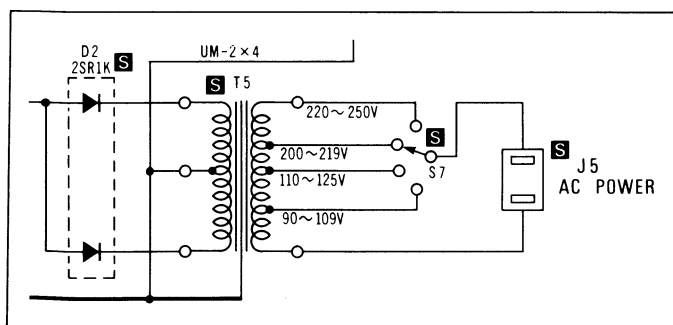
# RQ-312SD

The following shows the differences between the parts of RQ-312S-E and RQ-312SD. For comparison, please refer to the Service Manual of model RQ-312S-E. There are no great changes except the differences of parts listed below. There will be, therefore, no inconveniences in performing service work and carrying on complete parts control.

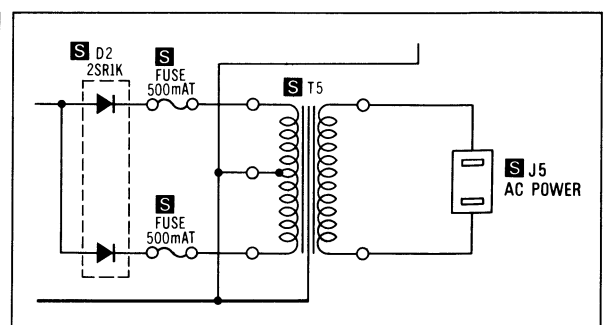
We hope you will make the best use of this Supplementary.

Ref. No.	Description	Part No.		Remarks
		RQ-312S-E	RQ-312SD	
M65	Motor Rubber Cushion	QBG1373(4 pcs.)	QBG1373(1 pcs.)	
M66	Eylet	QMSK0071 (2 pcs.)	QMSK0071 (1 pcs.)	
M69	Motor Holding Angle	QMA2408	QMA2531	
T5	Power Transformer <b>SAFETY</b>	QLP0707W	QLP0625B	
S7	Rotary Switch (AC Voltage Selector) <b>SAFETY</b>	QSR0005B	—	Disused
E3	AC Socket <b>SAFETY</b>	QJS0316H	QJS0320	
E10	AC Socket Cover <b>SAFETY</b>	—	QTKW0006	Added
E11	Fuse <b>SAFETY</b>	—	XBAQ0003 (2 pcs.)	Added
E12	Fuse Holder	—	QTF1020	Added
G2	Bottom Case Assembly	QYCK0102	QYCK0107	
A2	AC Power Cord with Cap	QFC1066	SJA78	SD Supply
A5	Instruction Book	QQT0875	QQT0942	
A6	DIN Cord	—	RP050A	Added
P1	Inside Carton	QPNK1017	QPNK1024	

**RQ-312S-E**



**RQ-312SD**



**NOTE:** **SAFETY** and **S** indicated that only parts specified by the manufacturer be used for replacement in critical circuits.

# ADJUSTMENTS

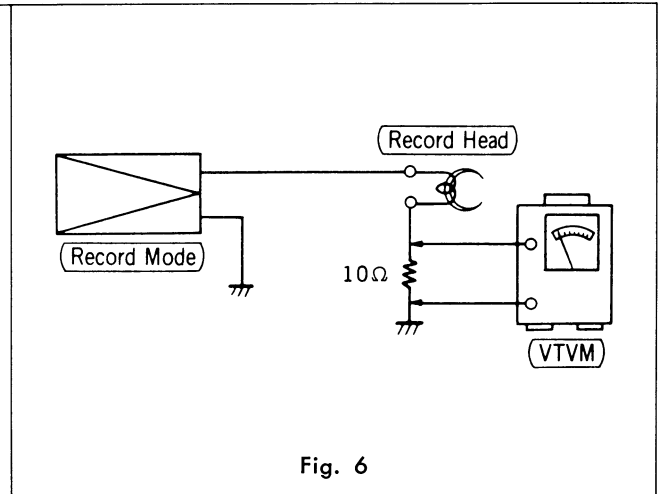
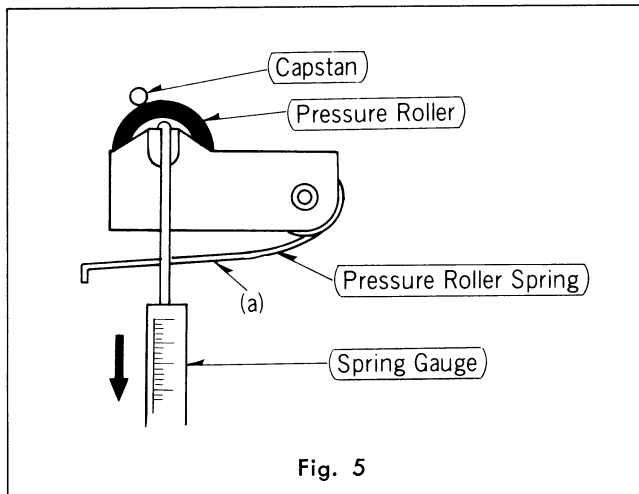
## MEASUREMENTS AND ADJUSTMENTS METHOD

### A. PRESSURE ROLLER ADJUSTMENT (See fig. 5)

1. Set into playback mode.
2. Connect the spring scale to pressure roller lever and pull it in the direction of the arrow as shown in fig. 5.
3. Measure the tension at the moment when the pressure roller moves away from the capstan.  
Standard tension:  $400 \pm 50$  gr
4. If the tension is out of tolerance, bend the part (a) of the pressure roller spring in either direction shown by the arrow until the correct pressure is attained.

### B. RECORDING BIAS CURRENT ADJUSTMENT (See fig. 6)

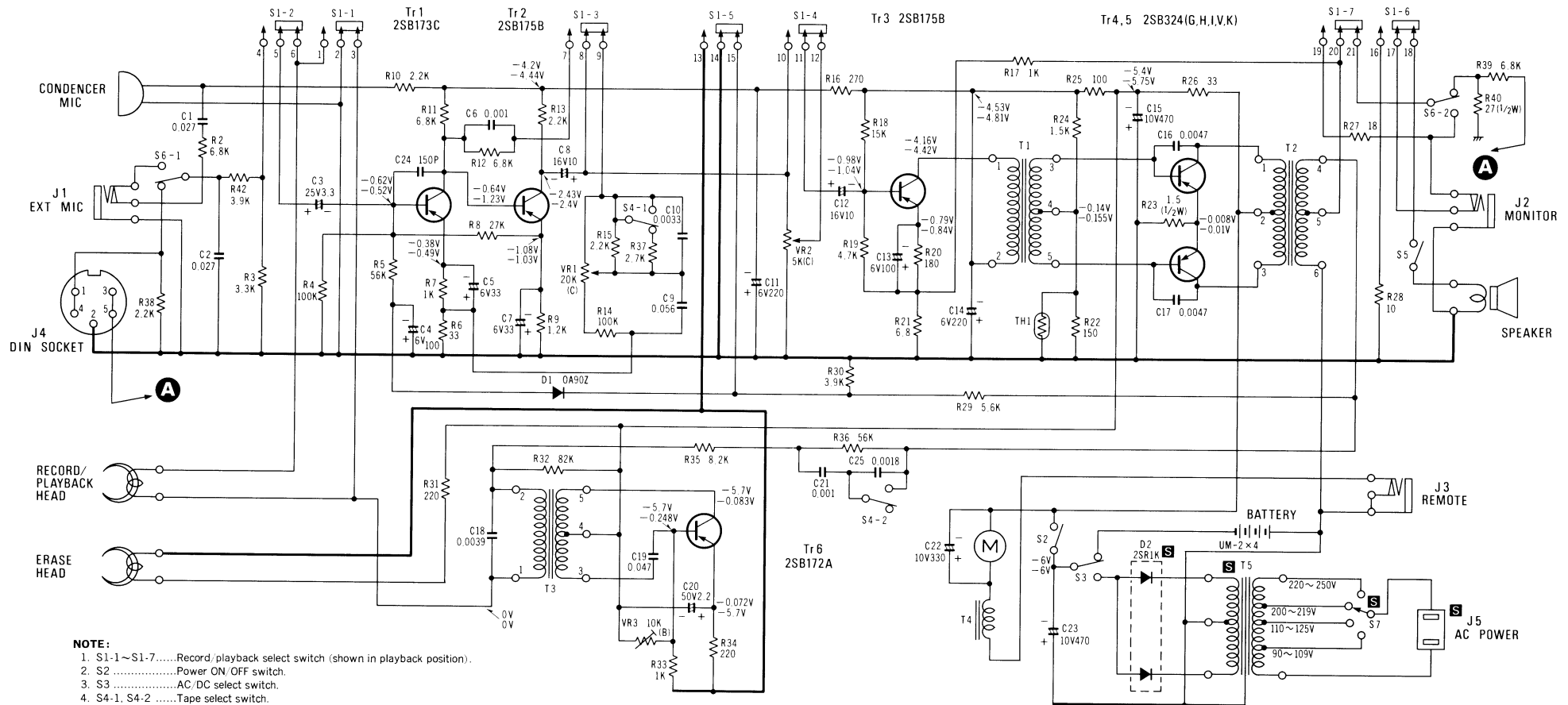
1. Connect  $10\Omega$  resistor as shown in fig. 6.
2. Connect VTVM to both end of  $10\Omega$  resistor.
3. Set into RECORD mode, read voltage on VTVM.  
Standard voltage:  $5.0 \pm 0.5$  mV.
4. If the voltage is out of tolerance, adjust control VR3 until the VTVM indicates above value.



### C. OTHER SPECIFICATIONS FOR REFERENCE (NO ADJUSTABLE)

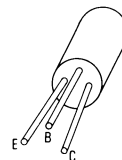
ITEM	VALUE	REMARKS
Takeup tension.	$55 \pm 15$ gr-cm	Use cassette torque meter (RP8063).
Tension of detect piece.	$50 \pm 10$ gr	—
Wow & flutter.	RMS: 0.4% or less	Use 3 kHz test tape (C-WAT).
Tape speed fluctuation.	$\pm 3\%$	Use 3 kHz test tape (C-WAT).
Standard recording input level.	1 kHz MIC: $-72 \pm 4$ dB	To obtain $40\mu A$ of current through the head. Stop the bias oscillation by unsoldering point A shown in printed circuit board view on page 4.
Bias oscillation frequency.	$35 \pm 5$ kHz	—
Erase current.	$10 \pm 1.5$ mA	—

# SCHEMATIC DIAGRAM MODEL RQ-312S-E

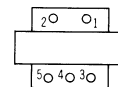


## TERMINATIONS (BOTTOM VIEW)

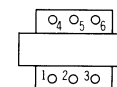
Tr 1, 2, 3, 4, 5, 6



T1



T2

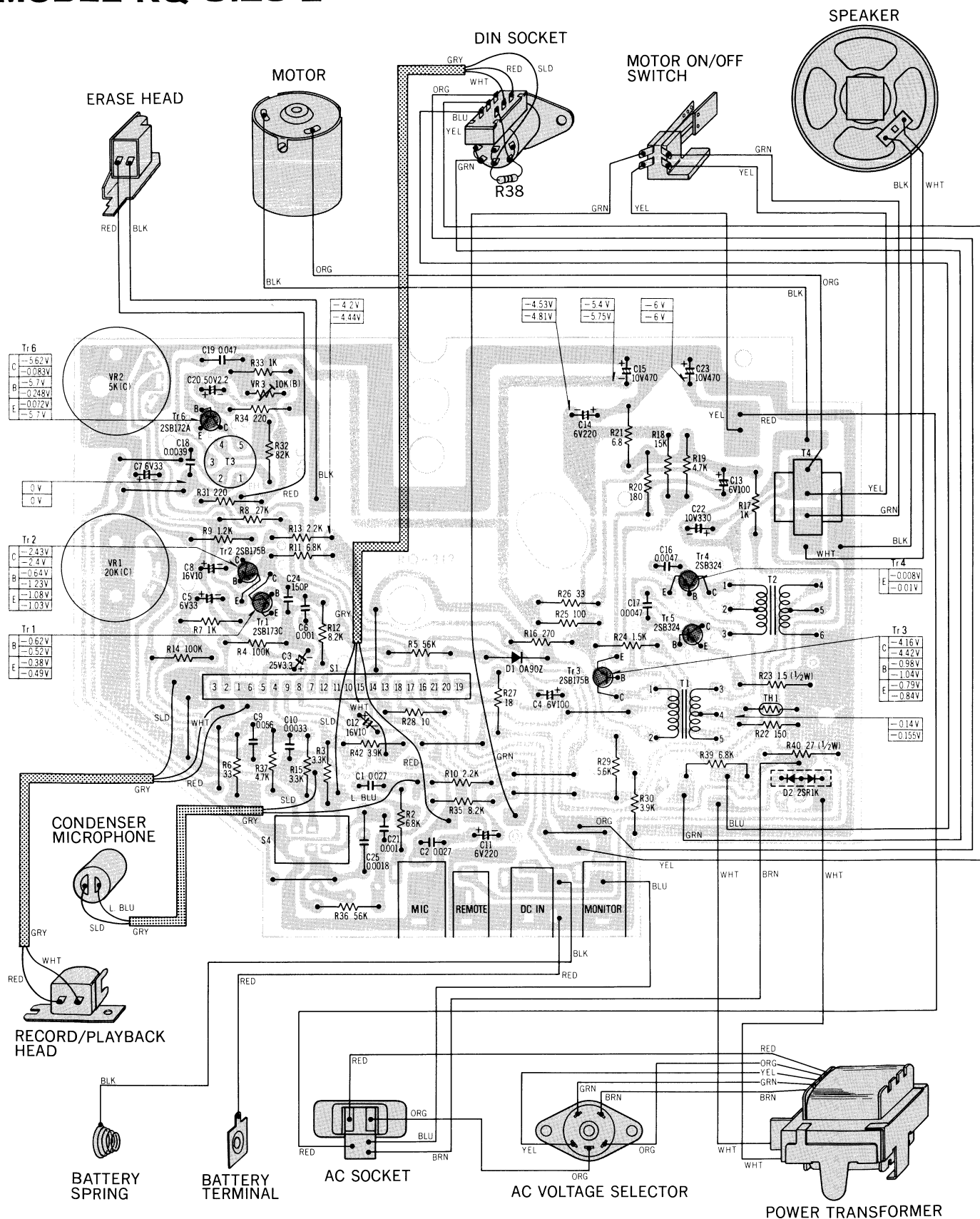


T3



# WIRING CONNECTION DIAGRAM

## MODEL RQ-312S-E



### NOTE:

The circuit shown in red on the conductor is B circuit. Values indicated in   are DC voltage between the chassis and electrical parts.

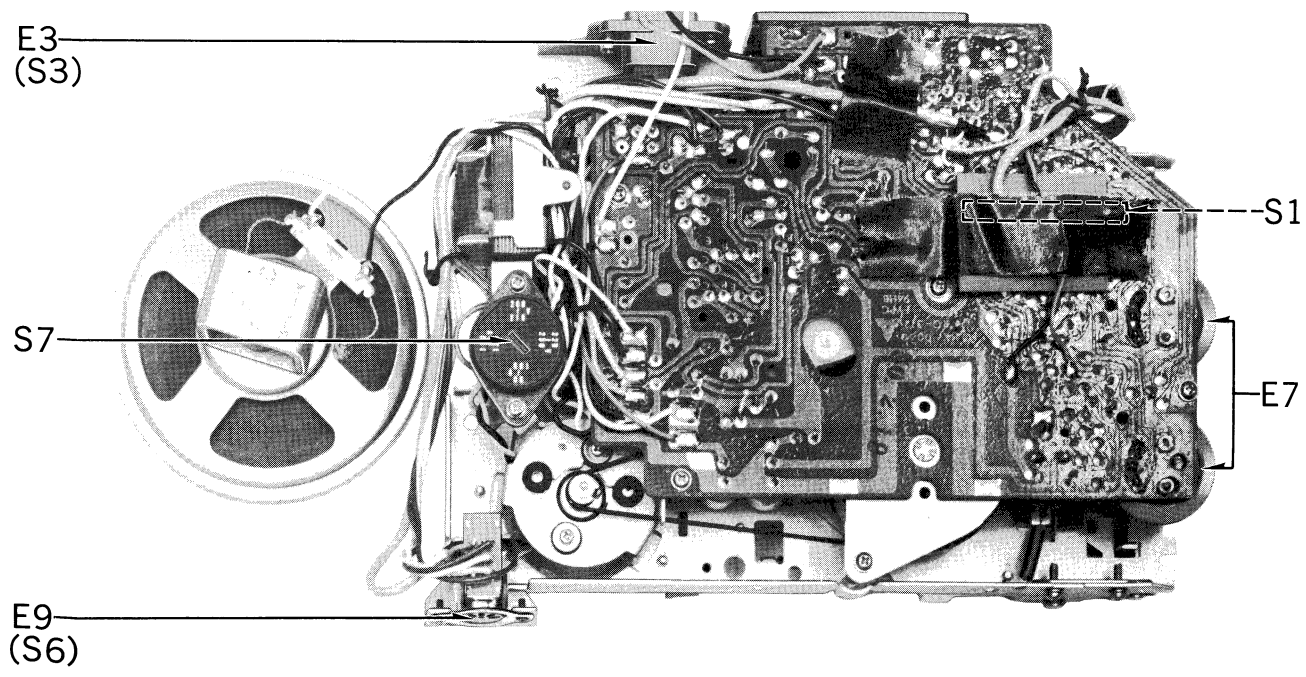
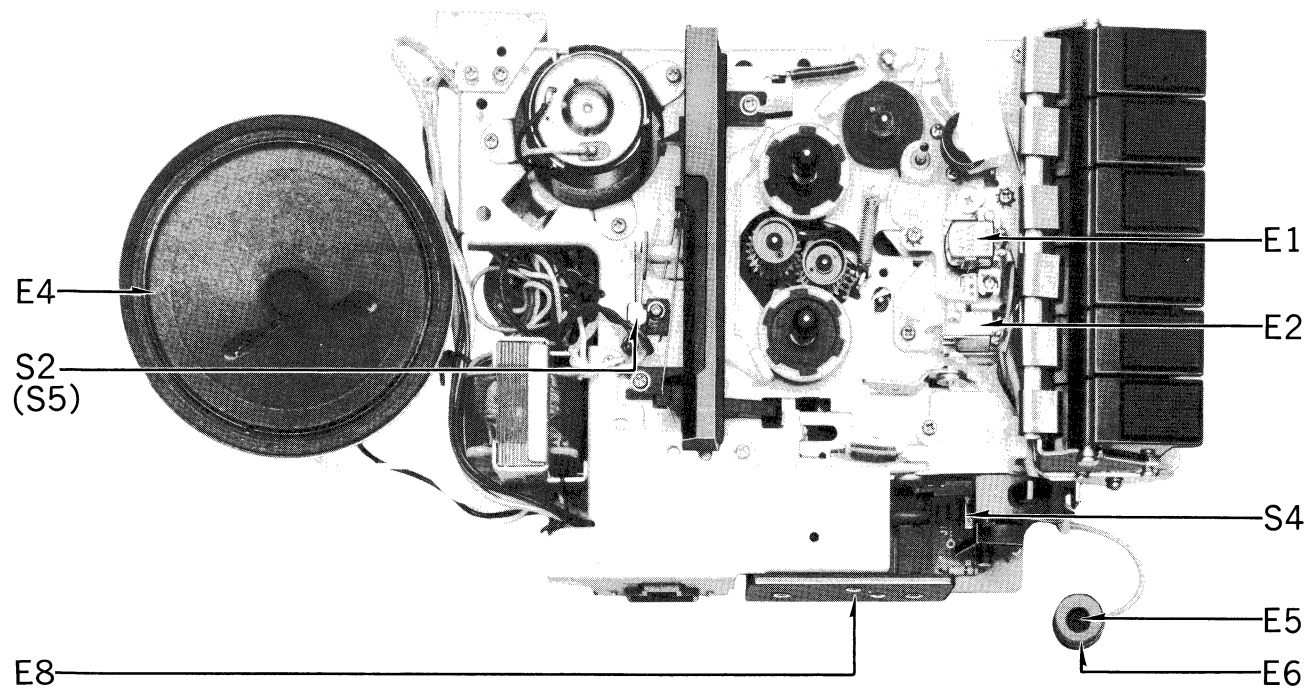
The upper values should be measured during recording and the lower values during playback.

### NOTE:

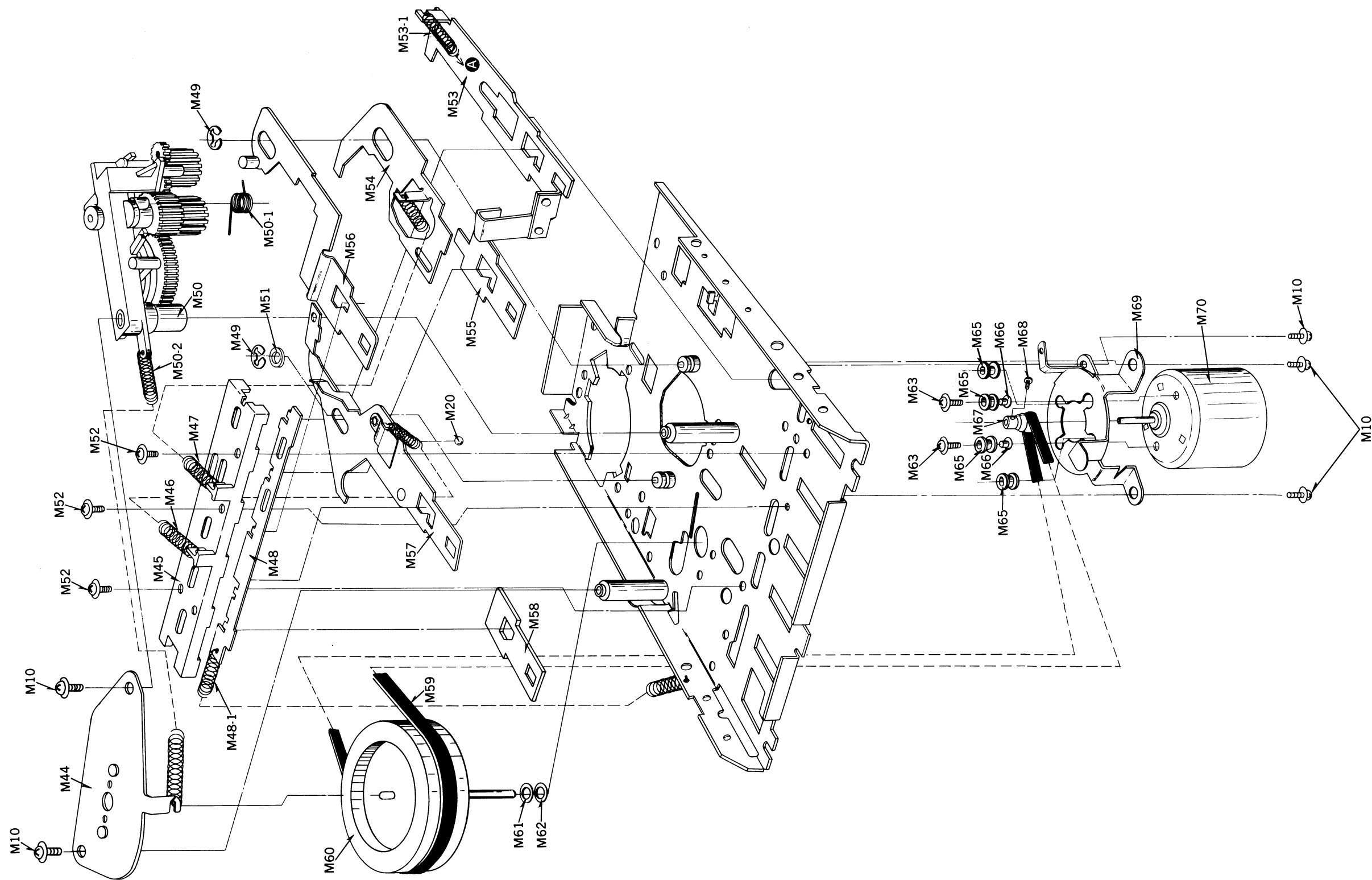
BLK .....Black  
BLU .....Blue  
BRN .....Brown  
GRY .....Gray  
GRN .....Green  
L. BLU...Light Blue  
NIL .....No Color Mark

ORG.....Orange  
PNK.....Pink  
RED .....Red  
SLD .....Shield Wire  
VLT .....Violet  
WHT ...White  
YEL .....Yellow

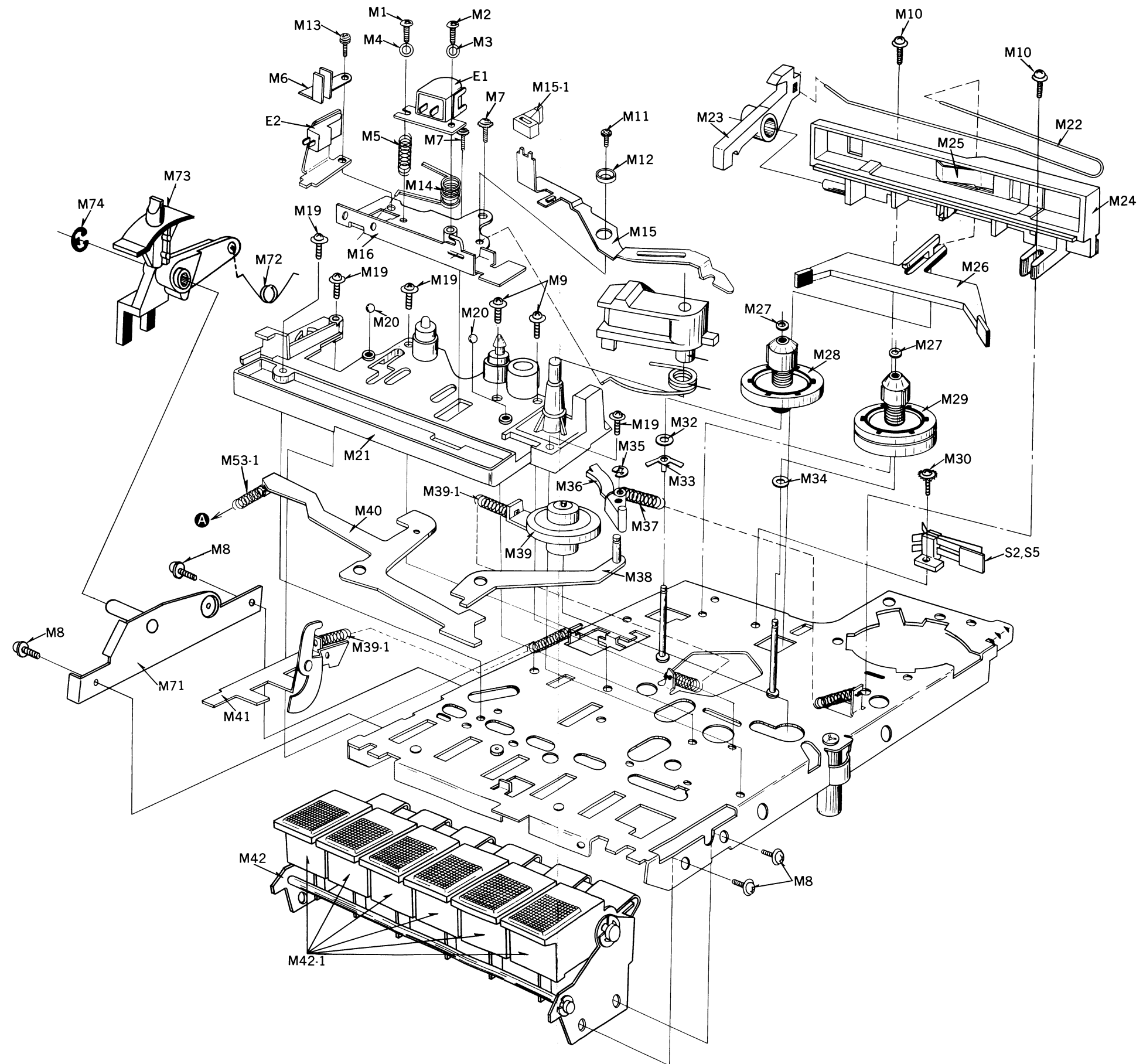
# ELECTRICAL PARTS LOCATION



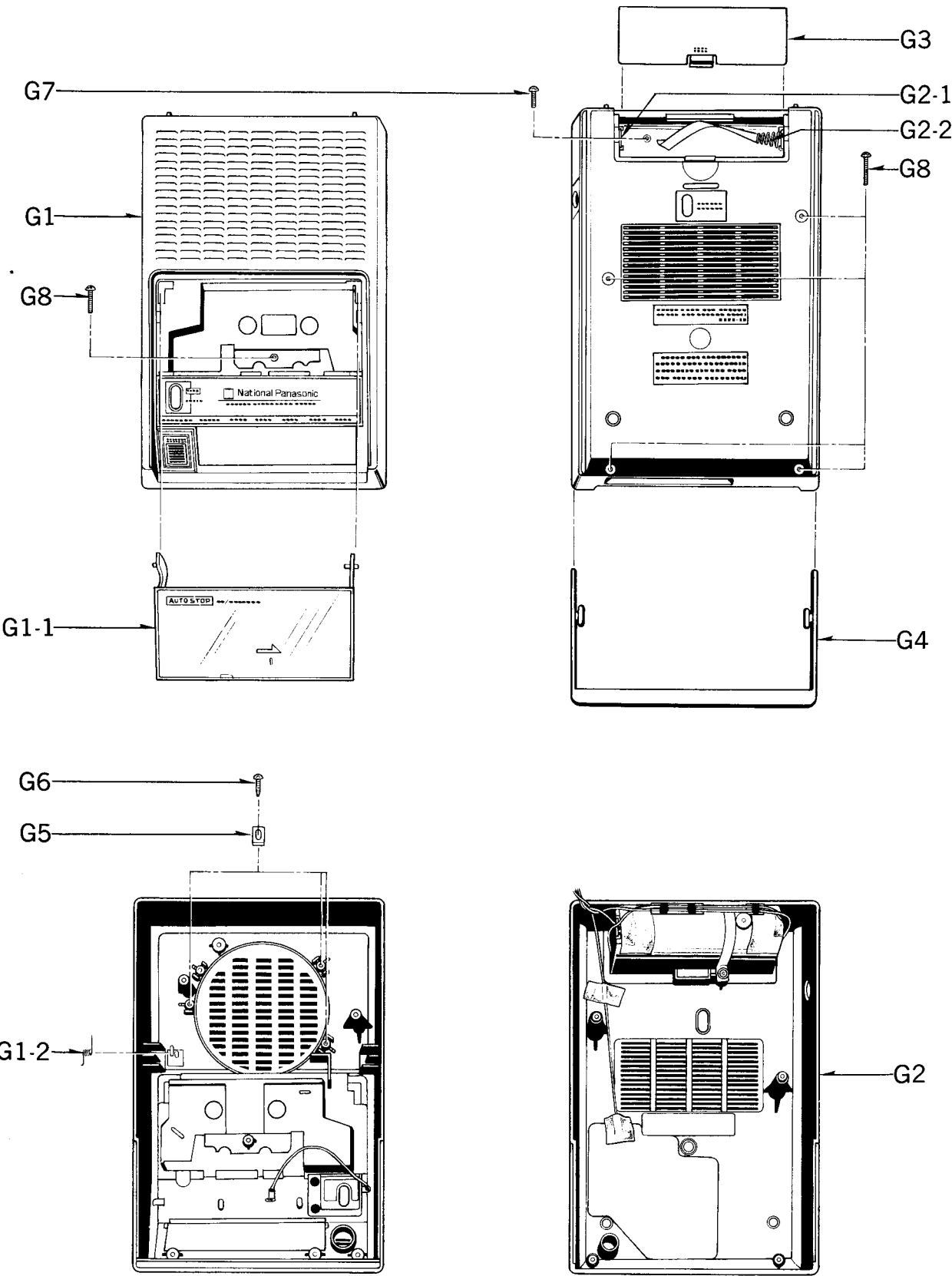




# EXPLODED VIEWS



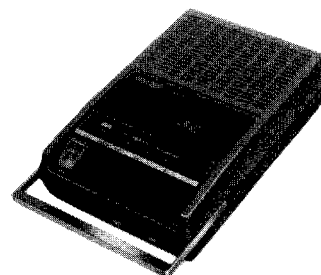
# CABINET PARTS



# REPLACEMENT PARTS LIST

MODEL RQ-312S-E

National Panasonic



RQ-312S-E

## NOTE:

1. Be sure to make your orders of replacement parts according to this list.
2. “**N**” in “Remarks” column indicates new parts.
3. **SAFETY** indicated that only parts specified by the manufacturer be used for replacement in critical circuits.

## NOTA:

1. Habrá que asegurarse que los pedidos de piezas de repuesto se hagan según esta lista.
2. “**N**” marcado en la columna “Remarks”, quiere decir que las piezas son nuevas.

## NOTE:

1. Bien s'assutet de se conformer à la liste suivante pour les commandes de pièces de rechange.
2. “**N**”, dans la colonne “Remarks”, indique les pièces nouvelles.

## HINWEIS:

1. Bestellen Sie Ihre Ersatzteile genau nach dieser Liste.
2. “**N**” in der “Remarks” Spalte bedeutet “neue Teile”.

## 按:

1. 關於代用零件之訂購，務請依照此表而行之為荷。
2. 「備考」(Remarks) 一欄中之 “**N**” 形符號標記表示該零件為新出品。

Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
	<b><u>MECHANICAL PARTS</u></b>					
M1	Screw $\ominus 2 \times 10$	XSN2-10	1			COMMON
M2	Screw $\ominus 2 \times 4$	XSN2-4	1			”
M3	Spring Washer $2\phi$	XWA2B	1			”
M4	Flat Washer $2\phi$	XWE2	1			”
M5	Head Spring	QBC1157	1			RQ-309AS
M6	Wire Clamper	QTD1224	1			<b>N</b>
M7	Screw $\oplus 2.6 \times 6$	XYN26+E6	2			COMMON
M8	Screw $\oplus 2.6 \times 8$	XYN26+C8	6			”
M9	Screw $\oplus 2.6 \times 8$	XSN26+8	2			”
M10	Screw $\oplus 2.6 \times 7$	XYN26+W7	7			”
M11	Screw $\oplus 2.6 \times 4$	XSS26+4	1			”
M12	Detect Lever Spacer	QMC0008	1			RQ-309AS
M13	Screw $\oplus 2 \times 4$	XYN2+C4	1			COMMON
M14	Auto Stop Detect Lever Spring	QBN1449	1			RQ-309AS
M15	Auto Stop Detect Lever Unit	QXL0843	1			”
M15-1	Detecting Piece	QBJ1538	1			”
M16	Head Base Plate Unit	QXK1662	1			<b>N</b>
M17	Pressure Roller Lever Assembly	QXL0844	1			RQ-309AS
M18	Pressure Roller Lever Spring	QBN1157	1			”
M19	Screw $\oplus 2.6 \times 10$	XSN26+10	4			COMMON
M20	Steel Ball $2.5\phi$	QDK1012	3			RQ-309AS
M21	Upper Base Plate Unit	QXK1493	1			”
M22	Brake Spring	QBS1057	1			RQ-309S
M23	Erase Safety Lever-B	QBJ1975B	1			RQ-309AS
M24	Cassette Retainer	QMF1716	1			”
M25	Plate Spring	QBP1601	1			”
M26	Brake	QML2729	1			”
M27	Snap Washer	QWQ1124	2			”
M28	Reel Table Assembly-L	QXD0037	1			”
M29	Reel Table Assembly-R	QXD0038	1			”
M30	Screw $\oplus 2 \times 5$	XYN2+W5	1			COMMON
M32	Washer	QBJ3224	2			RQ-309AS
M33	Back Tension Spring	QBPK0032	1			”

Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
M34	Washer	QBJ3104	1			RQ-309AS
M35	Stop Ring 2.5 $\phi$	XUC25FT	1			COMMON
M36	Auto Stop Drive Pawl	QBJ1656	1			RQ-309AS
M37	Auto Stop Spring	QBTk0014	1			”
M38	Auto Stop Drive Lever Unit	QXLK0101	1			”
M39	Idler Lever Assembly	QXLK0115	1			”
M39-1	Idler Lever Spring	QBTk0013	2			”
M40	Eject Lever	QML2724	1			”
M41	Lid Lock Holder Unit	QXH0196	1			”
M42	Push Button Frame Assembly	QXB0349	1			Ⓝ
M42-1	Push Button	QXB0350	6			Ⓝ
M44	Flywheel Retainer Unit	QXH0219	1			Ⓝ
M45	Lever Guide	QBJK0090	1			RQ-309S
M46	Playback Lever Spring	QBT1581MA	1			RQ-309AS
M47	Fast Forward Lever Spring	QBT1582M	1			”
M48	Lock Plate Assembly	QXH0195	1			”
M48-1	Lock Plate Spring	QBT1713M	1			”
M49	Stop Ring 5 $\phi$	XUC5FT	2			COMMON
M50	Fast Forward Frame Assembly	QXL0451A	1			RQ-309AS
M50-1	Gear Lever Spring	QBN1196	1			”
M50-2	Fast Forward Frame Spring	QBTk0010A	1			”
M51	Fiber Washer 6.2 $\times$ 11 $\times$ 1	QBK7130	1			”
M52	Screw $\oplus$ 2.6 $\times$ 10	XYN26+W10	3			COMMON
M53	Record Lever Unit	QXL0841	1			RQ-309AS
M53-1	Record Lever Spring	QBT1637M	1			”
M54	Fast Forward Lever-2	QML2725	1			”
M55	Rewind Lever	QML2257	1			”
M56	Fast Forward Lever-A Unit	QML0840A	1			”
M57	Playback Lever Unit	QXLK0096	1			”
M58	Stop Lever	QML2258	1			”
M59	Flywheel Belt	QDB0141	1			”
M60	Flywheel	QXF0102	1			”
M61	Washer	QBJ3221	1			”
M62	Washer	QBJ3220	1			”
M63	Screw $\oplus$ 2.6 $\times$ 7	XYN26+B7	2			COMMON

Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
M65	Motor Rubber Cushion	QBG1373	4			RQ-309AS
M66	Eylet	QMSK0071	2			”
M67	Motor Pulley Assembly	QXP0498	1			<b>(N)</b>
M68	Pulley Set Screw $\oplus 2 \times 3$	XSN2+3	1			COMMON
M69	Motor Holding Angle	QMA2408	1			RQ-309AS
M70	Motor	QDM0653	1			”
M71	CrO <sub>2</sub> Switch Holding Plate	QES1315	1			<b>(N)</b>
M72	CrO <sub>2</sub> Switch Change Spring	QBN1475	1			<b>(N)</b>
M73	CrO <sub>2</sub> Switch Knob	QKJ0109	1			<b>(N)</b>
M74	Stop Ring 3 $\phi$	XUC3FT	1			COMMON
	<b><u>RESISTORS</u></b>					
R2, 11, 12, 39	Carbon Resistor 6.8 K $\Omega$ 1/4 W	ERD14TJ682	4			
R3	” 3.3 K $\Omega$ 1/4 W	ERD14TJ332	1			
R4, 14	” 100 K $\Omega$ 1/4 W	ERD14TJ104	2			
R5, 36	” 56 K $\Omega$ 1/4 W	ERD14TJ563	2			
R6, 26	” 33 $\Omega$ 1/4 W	ERD14TJ330	2			
R7, 17, 33	” 1 K $\Omega$ 1/4 W	ERD14TJ102	3			
R8	” 27 K $\Omega$ 1/4 W	ERD14TJ273	1			
R9	” 1.2 K $\Omega$ 1/4 W	ERD14TJ122	1			
R10, 13, 15, 38	” 2.2 K $\Omega$ 1/4 W	ERD14TJ222	4			
R16	” 270 $\Omega$ 1/4 W	ERD14TJ271	1			
R18	” 15 K $\Omega$ 1/4 W	ERD14TJ153	1			
R19,	” 4.7 K $\Omega$ 1/4 W	ERD14TJ472	1			
R20	” 180 $\Omega$ 1/4 W	ERD14TJ181	1			
R21	” 6.8 $\Omega$ 1/4 W	ERD14TJ6R8	1			
R22	” 150 $\Omega$ 1/4 W	ERD14TJ151	1			
R23	Wire-wound Resistor 1.5 $\Omega$ 1/2 W	ERM12PK1R5D	1			
R24	Carbon Resistor 1.5 K $\Omega$ 1/4 W	ERD14TJ152	1			
R25	” 100 $\Omega$ 1/4 W	ERD14TJ101	1			
R27	” 18 $\Omega$ 1/4 W	ERD14TJ180	1			
R28	” 10 $\Omega$ 1/4 W	ERD14TJ100	1			
R29	” 5.6 K $\Omega$ 1/4 W	ERD14TJ562	1			
R30, 42	” 3.9 K $\Omega$ 1/4 W	ERD14TJ393	2			
R31, 34	” 220 $\Omega$ 1/4 W	ERD14TJ221	2			

Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
R32	Carbon Resistor 82 K $\Omega$ 1/4 W	ERD14TJ823	1			
R35	” 8.2 K $\Omega$ 1/4 W	ERD14TJ822	1			
R37	” 2.7 K $\Omega$ 1/4 W	ERD14TJ272	1			
R40	Solide Resistor 27 $\Omega$ 1/2 W	ERC12GM270D	1			
	<b><u>VARIABLE RESISTORS</u></b>					
VR1	Variable Resistor 20 K $\Omega$ (C)	EVJA2AT12C24	1			RQ-413S
VR2	” 5 K $\Omega$ (C)	EVJA2AT12C53	1			RQ-309AS
VR3	Semi-fixed Variable Resistor 10 K $\Omega$ (B)	EVL40AA00B14	1			<b>N</b>
	<b><u>CAPACITORS</u></b>					
C1, 2	Mylar Capacitor 0.027 $\mu$ F	ECQM05273MZ	2			
C3	Electrolytic Capacitor 33 $\mu$ F	ECEA25V3R3LE	1			
C4, 13	” 100 $\mu$ F	ECEA6V100LE	2			
C5, 7	” 33 $\mu$ F	ECEA6V33LE	2			
C6, 21	Mylar Capacitor 0.001 $\mu$ F	ECQM05102MZW	2			
C8, 12	Electrolytic Capacitor 10 $\mu$ F	ECEA16V10LE	2			
C9	Mylar Capacitor 0.056 $\mu$ F	ECQM05563MZ	1			
C10	” 0.0022 $\mu$ F	ECQM05222MZW	1			
C11, 14	Electrolytic Capacitor 220 $\mu$ F	ECEA6V220LE	2			
C15, 23	” 470 $\mu$ F	ECEA10V470LE	2			
C16, 17	Mylar Capacitor 0.0047 $\mu$ F	ECQM05472MZW	2			
C18	” 0.0039 $\mu$ F	ECQM05392MZW	1			
C19	” 0.047 $\mu$ F	ECQM05473MZ	1			
C20	Electrolytic Capacitor 2.2 $\mu$ F	ECEA50Z2R2ME	1			
C22	” 330 $\mu$ F	ECEA10V330L	1			
C24	Ceramic Capacitor 150 pF	ECCW1H151	1			
C25	Mylar Capacitor 0.0018 $\mu$ F	ECQM05182MZW	1			
	<b><u>TRANSISTORS</u></b>					
Tr1	Transistor	2SB173C	1			RQ-309AS
Tr2, 3	”	2SB175B	2			”
Tr4, 5	”	2SB324	2			”
Tr6	”	2SB172A	1			”



Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
	<b><u>DIODE &amp; RECTIFIER</u></b>					
D1	Diode	OA90Z	1			COMMON
D2	Silicon Rectifier <b>SAFETY</b>	2SR1K	1			RQ-309AS
	<b><u>THERMISTOR</u></b>					
TH1	Thermistor	QVM800B	1			RQ-309AS
	<b><u>TRANSFORMERS</u></b>					
T1	Input Transformer	QLT3F6	1			<b>N</b>
T2	Output Transformer	QLA0360	1			RQ-309AS
T3	Oscillator Transformer	QLB0166	1			”
T4	Choke Transformer	QLPK0007	1			”
T5	Power Transformer <b>SAFETY</b>	QLP0707W	1			”
	<b><u>SWITCHES</u></b>					
S1	Slide Switch (Record/Playback)	QSS7203	1			<b>N</b>
S2	Leaf Switch (Power ON/OFF)	QSB0186	1			<b>N</b>
S3	AC/DC Select Switch	Refer to E3	(1)			
S4	Slide Switch (Tape Selector)	QSS2207T	1			<b>N</b>
S5	Speaker Induction Hum Cutting Switch	Refer to S2	(1)			
S6	DIN Switch	Refer to E9	(1)			
S7	Rotary Switch (AC Voltage Selector) <b>SAFETY</b>	QSR0005B	1			RQ-309AS
	<b><u>ELECTRICAL PARTS</u></b>					
E1	Record/Playback Head	QWY0117	1			RQ-421S
E2	Erase Head	QWY2119	1			RQ-309AS
E3	AC Socket with S3 <b>SAFETY</b>	QJS0316H	1			”
E4	Speaker	EAS9P70SC	1			”
E5	Condenser Microphone	WM053T	1			”
E6	Microphone Cushion	QBG1481	1			”
E7	Volume Knob	QGTK0009	2			RQ-413S
E8	Jack Board Unit	QEJK0052	1			<b>N</b>
E9	DIN Socket	QJA0429A	1			RQ-443S

Ref. No.	Description	Part No.	Pcs/ Set	Price (Per Pce.)		Remarks
	<b><u>CABINET PARTS</u></b>					
G1	Body Case Assembly (without Speaker)	QYBK0148SW	1			N
G1-1	Cassette Lid	QKFK0022	1			N
G1-2	Cassette Ejection Spring	QBNK0009	1			N
G2	Bottom Case Assembly	QYCK0102	1			N
G2-1	Battery Terminal	QJB0047	2			RQ-309AS
G2-2	Battery Spring	QJB0004	2			”
G3	Battery Cover Assembly	QYD1009	1			N
G4	Handle	QKH1113	1			N
G5	Speaker Holding Metal	QKT1172	3			RQ-416S
G6	Tapping Screw $\oplus 3 \times 6$	XTN3+6	3			COMMON
G7	Screw $\oplus 2.6 \times 6$	XSN26+6FC	1			RQ-309AS
G8	Screw $\oplus 2.6 \times 11$	XSN26+11FC	5			”
	<b><u>ACCESSORIES</u></b>					
A1	Cassette Tape	QFT1TCANAHZ	1			RQ-309AS
A2	AC Power Cord with Cap <b>SAFETY</b>	QFC1066	1			RQ-432S
A3	Erase Plug	QJP0959A	1			RQ-317S
A4	Carrying Bag	QFKK0020	1			N
A5	Instruction Book	QQT0875	1			N
	<b><u>PACKINGS</u></b>					
P1	Inside Carton	QPNK1017	1			N
P2	Pad-A	QPSK1024	1			N
P3	Pad-B	QPSK1021	1			N
P4	Inner Cushion	QPAK1023	1			N
P5	Dust Cover	XZB26X36A05	1			RQ-309AS